

Maia Mitchell

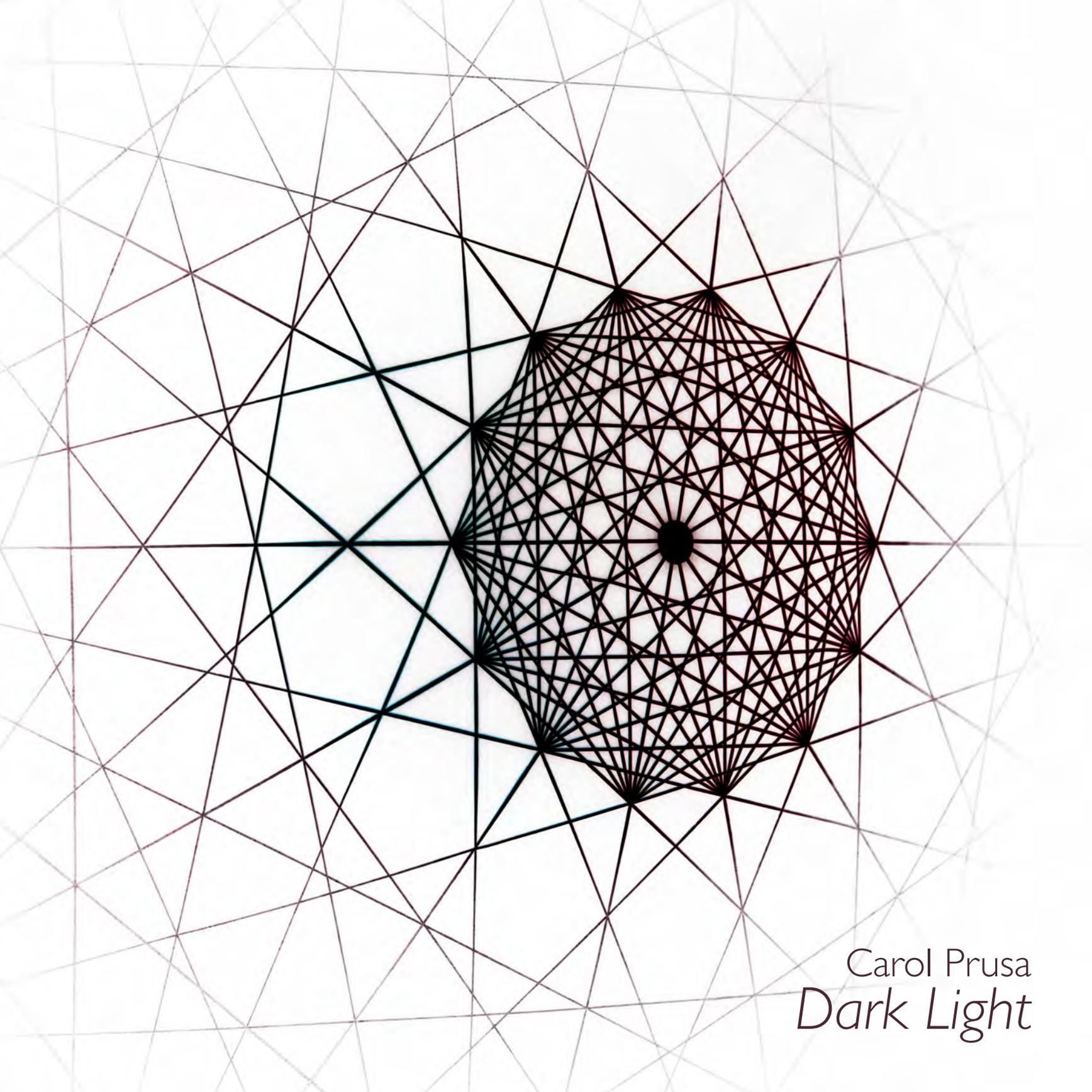
Carol Prusa
Dark Light

*Its (arts) concern is the edge,
and the making of a form out of
the formlessness that is beyond the edge.*

Mary Oliver (Upstream, 2016)

*We reach forth and strain every nerve
but we seize only a bit of the curtain
that hides the infinite from us.*

Maria Mitchel (In Life, Letters, and Journals, 1896)



Carol Prusa
Dark Light

Capturing the Complexities of Dark–Light: Carol Prusa’s Mysterious Cosmic Orbs

by Barbara L. Miller

I began to use pure black as a colour of light and not as a colour of darkness. (Henri Matisse)¹

Our feeblest contemplations of the Cosmos stir us – there is a tingling in the spine, a catch in the voice, a faint sensation, as if a distant memory, of falling from a height. We know we are approaching the greatest of mysteries. (Carl Sagan)²

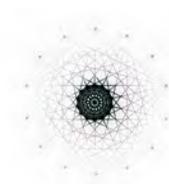
Carol Prusa’s engagement with deep space began early in life. Lying alone, in the stillness of night, she would gaze out her bedroom window and look up – not just a little up, but way up. As a youth, she imagined herself floating in a void, and wondered what was it like to be out there, alone, untethered, floating in outer space. What was nothingness? So overwhelming was this early “thought experiment” that it laid the groundwork for Prusa’s mature artistic practice; in the past decade, it has become increasingly evident in her various series of provocative hemisphere-shaped works: from her imaginative sequence of light-speckled domes, to her suggestive chain of glowing 3-D orbs, to her illuminating cycle of low-relief circular expanses, Prusa consistently revisits, advances and expands her early reflections on deep-space whereby she abstractly speculates and sensually imagines what it is experientially like to float in absolute and unlimited space.

For example, in *Threshold* (2007) (36” x 36” x 18”), Prusa captures the sensation of drifting, untethered in deep space. As in other dome-shaped works in this series, she all but covers the hemispheric orb’s convex surface with interlinked biomorphic patterns, comprised of silverpoint drawings, graphite washes and titanium white highlights, which hover on a just barely visible silvery background. Rather than anchoring the viewer to a central, earthbound vanishing point, Prusa engages an all-over composition in order to decouple that traditional form of privileged point of view. Using what she refers to as “divine symmetries and mathematic ratios,” she subtly suggests an internal energy that draws on the mysteries of plant transformation, in which radiant light is absorbed and converted into an energizing substance. To this intricate pattern, she adds an array of fiber optics lit by LED lights. The resultant constellation is a thick network of suspended particles and radiated light in which the viewer becomes not a disciple of a religious narrative but a heliotropic entity, floating out there, drawn to the soft radiation of silvery brightness and expansive network of twinkling constellations.

Skip forward a decade and a similar urge to explore the absoluteness of nothingness appears in works such as *Umbra* (2018) (36” x 36” x 2”). Here, Prusa’s signature biomorphic patterns are less about discernible, self-forming constellations than cosmic dust-clouds swept to the edges of the painting. In addition, she replaces the small, silvery mirror-like



Carol Prusa, *Threshold*, 2007, 36 x 36 x 18 inches with fiber optics



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Umbraphile, Barbara L. Miller, Ph.D.

Passionate sky gazer, Joseph M. Prusa, Ph.D.

The women who take measure of the stars.

apertures with a single gargantuan central black chasm. Upon closer inspection, however, the dark abyss is activated with tiny undulating amoeboid-shaped dark forms, evoking what scientists refer to as “dark matter.” In dominating the expanse of *Umbra*, the mysterious surface scientifically resonates with recent astrophysicists’ estimates that, within outer space, dark matter – the unknown “stuff” – most likely accounts for eighty percent of the universe’s matter.

Prusa’s recent unexpected shift from achromatic greys to intense dark blacks arose, she states, unexpectedly out of her experience of seeing the August 2017 total solar eclipse. The eerie dark-light luminescence that occurs when the moon blocks the sun’s light became, as Prusa explains, a “gateway” and she began to explore, not so much the cosmic absence of electromagnetic force, but a heightened understanding of dark-light sensuality. In her current series, she turns to dark-adapted (scotopic) vision, in which human perception becomes more receptive to the complexity of low-lit surface reflectance. Indeed, as other artists before her have understood, very notably Matisse, black is not the color of darkness but rather a sensuous understanding of relative values of illumination. Surprisingly, in such dark-light conditions, dark surfaces can appear self-luminescent. While this essay takes its cues from Prusa’s earlier works and spatial experiments, following her long path of discovery that began decades ago in Florence, it ultimately looks more directly at Prusa’s in-progress dark-light exploration of cosmic phenomena.

Years ago, while teaching in Italy, Prusa discovered two important elements: silverpoint drawings and architectural domes. At the Uffizi Gallery, she closely observed works by artists such as Leonardo da Vinci and noted useful aspects of his artistic practice. Once back in her studio, she began experimenting with silverpoint, using it as an “under” layer and discovering, she states, that the historical medium “doesn’t smear, it stays sharp and has a beautiful tone.”³ Working in black and white, her use of silverpoint afforded “these strange shifts between warm and cool that add a little breath of life to the piece.” Simultaneously, her time in Florence furthered her predisposition to look up. On the ceilings of galleries and architectural landmarks, she observed richly embellished cupolas, many of which depicted a variety of Christian narratives, from judgment, to redemption, to ascension. Ever the stargazer, these domed structures became not only materially and metaphorically central to Prusa’s practice, but they also conceptually and critically informed her expanded investment in deep space.

Domes turn on an array of historical and cultural associations. As architectural designs, they are one of the oldest building construction types. From humble indigenous shelters to striking Persian mosques, domes populate our rich transcultural history of architectural fabrication. Over the centuries and across cultures, the hemispheric dome design morphed into other shapes; onion, oval, umbrella and, more recently, geodesic. Though the dome dates back to pre-historic periods, it was only in 15th century Florence that architect-builders and crafts-persons took domes, quite literally, to new heights. In Florentine lingo, such human-designed high canopies were meant to symbolize the heavens above; they signified a spiritual desire and physical longing to enter the thickness of the ethereal realm. Yet, while Prusa states that domes signify “transcendence” – entering the otherworldly realm of the cosmos – it is important to note that rather than working on the form’s concave side, Prusa flips the form. As a result, instead of an immersive concentrated, enclosed experience, which in Renaissance architecture was meant to bring the ethereal realm down to earth, she uses the engineered form’s convex surface. Her domes harness not a religious realm, but open up an expansive labyrinth of architectural practices and metaphorical evocations that may invoke a spiritual cosmic resonance, yet

more resoundingly speak to more secular scientific affiliations – a touchstone that permeates her career and invigorates her current artistic endeavors.

After completing her Bachelor of Science at the University of Illinois Medical Center, Prusa worked in a process-oriented job: a medical illustrator, sketching cadavers and dissecting corpses. Since then, she has branched out to study geometry, physics, philosophy and astronomy – often spending nights with her partner, applied mathematician and atmospheric physicist Joseph Prusa, gazing at Mars and Jupiter. In her work, not only does she merge disciplines – art, technology, science and philosophy – but also transgresses boundaries; Prusa regularly combines traditional drawing and sculptural practices with new media and digital art. Correspondingly, her work demonstrates a practical sense of interconnectedness: the linking of historical artistic practices to modern industrial fabrication techniques to popular maker-community activities (along with programmed LED lights and fiber optics, she uses 3-D printing and CNC routing), all the while invoking larger questions about our knowledge of the universe and our place in the cosmos. For close to two decades, Prusa has addressed her interest, verbally and artistically, in mathematical models and the concept of a TOE – a Theory of Everything, within which all physical aspects of the universe are reduced to a single grand unified field and everything is interconnected. Prusa, for example, sees cross-connections between George Johnson’s contemporary account of how scientists have come to conceptualize and measure the universe, specifically stressing 19th century astronomer Henrietta Leavitt’s foundational research and insights, and Edmund Burke’s modernist notion of the sublime. In Burke’s revival of the concept of the sublime, the 18th century philosopher provocatively used such phrases as “delightful horror;” suggesting we are sensuously attracted to yet psychologically overwhelmed by the infinity of outer space. It is through such cross-connections that Prusa’s use of arched forms takes on broader symbolic and metaphoric significance.

The dome remains a preferred design for state-of-the-art astronomical observatories, housing advanced instrumentation that astronomers employ in cutting-edge practices. For example, in the past century these open-space structures were home to historically significant telescopes such as the 11-inch Draper, the 13-inch Boyden and the 24-inch Bruce. 19th and early 20th century scientists fitted these devices with photographic equipment and recorded their nightly observations on silver-coated plates, producing spectrographs of stars. They then handed this raw data over to an important group of women astronomers who manually analyzed and categorized the information. Building on each other’s insights, members of this group developed stellar classification systems and pioneering research methods. Though as a group these women astronomers were and are still often referred to simply as the “Harvard computers,” more recently its members, which included such notables as the already mentioned Ms. Leavitt (whose brightness studies of pulsating stars led to current calculations of cosmic distances) as well as Antonia Maury (a student of the first modern female US astronomer, Maria Mitchell, Maury developed one of the first catalogs of star classifications) and Annie Jump Cannon (whose revised stellar classification system won her worldwide recognition), have garnered more well-deserved individual attention.⁴

The advancement of technology has currently resulted in vastly more powerful telescopes than were available to the Harvard astronomers. These instruments now enable us to peer far beyond the confines of our own galaxy and to such fantastically distant reaches of the universe that they would have been unimaginable a century ago. Nevertheless, the brilliant theoretical

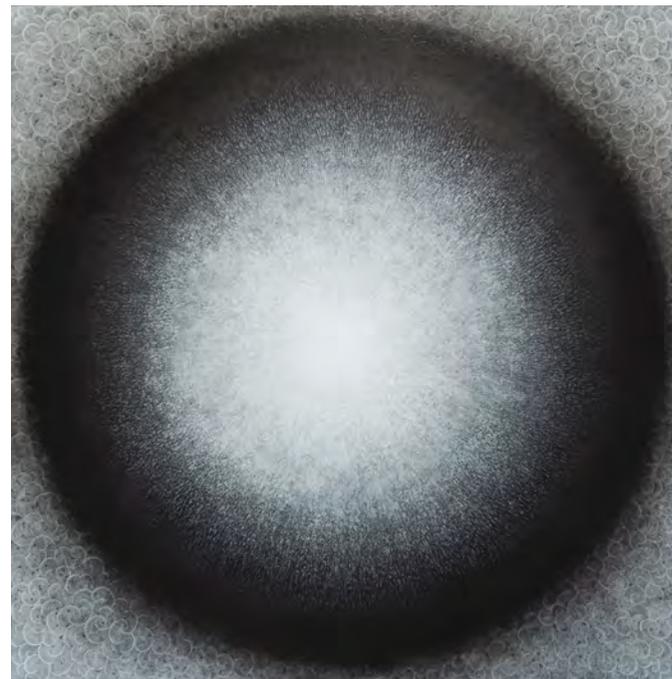
analysis of the stars of the Milky Way galaxy and its nearby Magellanic Clouds by Leavitt, Cannon, Maury and company continue to be fundamental in understanding and appreciating the magnitude and complexity of the universe in which we exist – a fact not lost within Prusa's latest endeavors.

In her most recent eclipse-inspired works, Prusa looks imaginatively forward and notably back. For example, in works such as *Cosmic Web (for the Women of the Harvard Observatory)* (2018), she includes homage to the important accomplishments of the Harvard women, visually associating their work with diffraction grating and spectral analysis. Likewise, in pieces such as *Sublimation (Ms. Mitchell's Comet)* (2018), Prusa not only celebrates the American astronomer's noted discoveries in the title but also, within it, artistically demonstrates Mitchell's advice: in order to comprehend the unknown, science must work together with imagination.

Sublimation is a rich composition that dramatically switches from evocative biomorphic patterns to rational circular geometries to haunting ephemeral washes. In it, Prusa realizes fluidity between earth-bound geology, star-enraptured spectroscopy and artistic manifestation. Clearly, like Mitchell, she understands that science and art are alchemically linked to the elegance of "beauty and poetry."¹⁵ Decidedly, it is in this most recent series of dark-light works, in which Prusa's observational experiences play off her imaginative articulations, that she delves deeper into extra-terrestrial, dark-light illumination.

August 21, 2017 marked a centennial event: the first coast-to-coast solar eclipse in the United States since 1918 (though notably dozens of eclipses occur yearly, spanning different parts of the globe). It comes as no surprise that Prusa rushed to experience the moment, along with multitudes assembling across the nation, in the near 70-mile-wide cosmic trajectory that traversed the country, from the Oregon shoreline to the South Carolina coast. Moments before Prusa looked up from the bank of the North Platte River in Nebraska, removed her dark solar shades and, overwhelmed by the total eclipse, literally fell backwards, I stationed myself firmly on a hot, dry, dusty, crowded municipal airfield, in Madras, Oregon.

Throughout early history, eclipses (and other daytime events that caused the absence of sunlight) elicited a primordial feeling of dread. Often interpreted as evil omens,



Carol Prusa, *Sublimation (Ms. Mitchell's Comet)*, 2018, 36 x 36 x 2 in

eclipse events gave rise to predictions of portentous catastrophes. Such attitudes prompted irrational attempts to restart the burning globe by shooting fire arrows into the sky. Contrarily, in science, eclipses have led to numerous cognitive breakthroughs. Early on, Hipparchus, a Greek astronomer and mathematician, impressively used a solar eclipse to calculate the distance between the Earth and moon, "to within roughly 20 percent of the correct figure."¹⁶ In our modern period, the most famous eclipse experiment occurred in 1919, during which Sir Arthur Eddington observed that the sun's gravitational pull bent light rays from distant stars twice as much as predicted by Newton's theory of gravity. As New York Times science-writer Dennis Overbye explains, Eddington's findings "affirmed the prediction of Einstein's theory of general relativity, ascribing gravity to a warp in the geometry of space-time." Moreover, "Eddington's report made Einstein one of the first celebrities of the new 20th century and ushered in a new dynamic universe, a world in which space and time could jiggle, grow, warp, shrink, rip, collapse into black holes and even disappear. The ramifications of his theory are still unfolding; it was only two years ago that a rippling of space-time – gravitational waves produced by colliding black holes – was discovered."¹⁷

As my partner and I observed, the normally nighttime luminescent orb (depending on its cycle, the moon can appear as a light blue hovering asteroid during the day) shifted in tonality and form. Instead of passively reflecting the sunlight, as some sort of



Miller + Katsaros, *Eclipse 2017* (Madras, OR),

consolation for having no fire of its own, the spherical moon shifted into a spellbindingly dark, flat disc. Bite after bite, the now two-dimensional satellite appeared to enact retribution, voraciously eating into the radiating star. The inky moon rapidly consumed the sun through crescent-shaped phases; in under an hour, the moon almost completely swallowed the sun's light. Not to be totally overtaken, an eerie cool blue corona, invisible during normal daytime conditions, remained. Yet, the moon appeared in no mood to concede. Defying its celestial partner, it hovered proudly, gloating with its newfound halo. Its victory, however, was short-lived. After around two minutes, its rival rallied, sending out a photonic blast of white light, which formed into a gigantic luminescent bubble of energy, commonly referred to as "the diamond ring," which signaled the moon's retreat.

During the precious few minutes of the total eclipse we viewed the event without our protective glasses (and removed the filters from our cameras). After an hour of wearing these eyeprotectors, our eyes had adapted to dark-light vision; the photoreceptors in our eyes had

shifted from daytime or photopic to a heightened achromatic perception or scotopic vision. As scientific studies demonstrate, scotopic vision turns upon a finely tuned awareness of relative tonal effects, in which our optical receptors more complexly perceive variances in contrast-levels. Scientific inquiry, however, is not enough. Even though the inner workings of human vision (the shift from cones, which are only active in higher levels of light, to rods, which are sensitive to lower light levels) are meticulously documented and experimentally demonstrated, psychophysiological perception is far from an exact science. Perceptually seeing what's out there, as the eclipse revealed, it is also the property of imaginative inquiry. With eyes open wide, we registered the subtle contrasts of the cosmic event: encircled by an intensely luminescent and vibrant corona (which shifted outward from white to various combinations of green, red and yellow, finally disappearing in an intoxicating blue), the moon became the darkest of darks and the sky metamorphosed into a self-luminous, dark-energy, just within our perceptual limits. As fluctuating luminosities and fleeting intensities overtook us, the cosmos stirred us and, as Carl Sagan cites in his direct observations, gave rise to a tingling in our flesh. Here, however, rather than a distant memory of "falling from a height," our experience of the total eclipse provoked a profound quickening. Suddenly and only for a breathtaking instant, the earth fell away and we floated in space.

At that moment, as totality enveloped everyone in the Oregon airfield with its weird dark-light, Prusa's thought experiment of being out there – way out there – resonated. For a brief moment, time stalled and perception turned inward, toward contemplation of the unlimited abyss; we fell, not from a distant height, but into thick infinity. Subsumed into such mysterious luminescence, we experienced a sense of being part of absolute nothingness and resounding fullness – a convergence of geological time and cosmological space. This sudden encounter with such vast phenomena momentarily threatened our sense of being, our physical selves. As it chilled our flesh (atmospheric temperatures precipitously dropped), we became sensually overwhelmed, lost outside of time and space; we experienced a deep somatic resonance with the sublime.

As stated, discoveries of mysterious dark matter, dark energy and black holes – as Overbye puts it, the "dark stuff" – fascinate Prusa. While astrophysicists are still trying to figure out how the dark shadows of the universe provide "the gravitational scaffolding for galaxies" (Overbye), dark stuff gives rise to the artist's imagination: in her recent eclipse-inspired works, Prusa follows Mitchell's instructions to seize "a bit of that curtain that hides the infinite from us" and captures the complexities of dark-light. In the process, Prusa realizes the psychophysiological aspects of deeply felt human perception of dark stuff. In these 2017-8 works, she attempts "to express," as she states, "the sensation and tones" of her eclipse experience.

For example in *Primordial* (2017), Prusa begins with a flattened structure; instead of an arching curvature, the work now turns upon a uniform, ¼-inch thick circular acrylic plate. On its surface, Prusa encapsulates her signature, seemingly self-iterating, biomorphic patterns within a narrow edge, at the circle's outer margin. Like a corona of glowing light, the tessellated edge-pattern frames an expansive murky interior. Arising like heat waves from the lower section, tendrils of swirling, mysterious wisps shoot heliotropically toward an internal radiative source, situated on a low-lying horizon. Above, a cumulus-like cloud scatter rapidly lightens as it descends toward that glowing sphere. Like the light-burst of the eclipse's diamond ring, the blazing orb simultaneously energizes the achromatic cloud-like vortex and the serene ocean-like plateau. The resultant contrast of lights and darks provocatively evokes a deep psycho-physiological response: the lighter embryonic edge plays off the internal glowing orb, giving

the effect that the thin space of the surface pulses in and out and breathes with celestial light. Like Otto Runge's *Morning* (1808), which features an eclipse, Prusa explores the genesis of primordial light. However, rather than returning to the 19th century German Romantic's cool, short-wave blue-yellow light – the first light of dawn – Prusa draws on the embryonic life force of the cosmos' dark-light. *Primordial* reveals neither a chromatic celebration of morning light nor a pagan-infused Christian narrative of human birth, but a mesmerizing emergent or experiential "elegant" space – what Prusa calls "thin space": the vanishing point of infinity, the universality of outer space. It is into these experiential sensations of dark-light contrasts that Prusa delves deeper into her more recent works. In her latest works, she shifts from achromatic greys to intense blacks, engaging what other artists before her refer to as the "sensitive observer."

To return for a moment to *Umbra*, it is clear that although Prusa shifts formats (instead of a flat acrylic disc she uses a 36-inch x 36-inch square wood panel), the circular dome continues to dominate her composition. Here, however, the dome is opened up. In *Umbra*, Prusa dramatically sweeps her nascent petal formations to the outer edge. Instead of a uniform ring of circumferential light, as in *Primordial*, Prusa subtly applies a gradated light to the rounded ring of budding petals. The low-lit corona settles around a large, open aperture – and open-sky oculus – where the somewhat brighter edge abruptly contrasts a large "mars" black centered circular disc. This understated contrast begins to engage a more finely tuned optical reaction to dark-light surfaces.

In human vision, as Stephen Palmer explains, "Light consists of minute packets of energy called photons that behave like waves in some respects and like particles in others."⁸ Color, as Isaac Newton famously demonstrated, only appears when visible light is split into its various composite wavelengths. Using a prism to split white light (sunlight) into a spectrum of colors (moisture in the air often acts like a prism and produces naturally occurring rainbows), the 17th century scientist's experiment demonstrated that when light strikes any surface, a partial splitting occurs: surfaces absorb photons and scatter back a section of white light's spectral composition. We perceive, for example yellow daffodils and blue irises because those surfaces reflect the respective segment of white light and the redirected photons fall on the photoreceptor cells in the retina (the multi-layered neuronal membrane situated on the back wall of the human eye). While vision scientists, theorists and philosophers debate whether color is a function of human perception or a phenomenon



Carol Prusa, *Primordial*, 2017, 60 x 60 x 2 in

of what's out there, perception of photonic reflectance is nonetheless a complex process, determined by a large number of parameters. As Joseph Levine explains, our perception of color and brightness depends upon the spectral reflectance of the object's surface, its surrounding surfaces, the type and intensity of illumination, as well as "the state of adaptation of the relevant neural mechanisms in the visual system ... and certain specified properties of the individual perceiver."⁹ In his nuanced analysis, philosopher Robert Pasnau says that waves do not just bounce off objects and argues for the existence of an epidermal-like thickness, in which spectral flux is absorbed, split and then relevant frequencies (depending upon the type of surface) are re-emitted. The result, he states, is "a complex microphysical event near the surface of the object."¹⁰ In other words, light is not just absorbed and reflected by a surface, it also energizes a thin surface layer. Such invigoration gives rise to the idea that not only is our perception of light in constant flux but that surfaces themselves are dynamically energized.

When artists shift to dark-light contrasts, as Stephanie Rosenthal astutely observes, they "demand a special kind of seeing from the viewer, the kind that grows accustomed to darkness."¹¹ They engage a different type of photoreceptor; instead of color-sensitive cones, they engage the dark-light sensitive rods, used to decipher the complexity of low-lit surfaces. We perceive not necessarily an absence of light but low-luminance contrasts where darks and lights play off one another. And in Prusa's "black" series, black, white and grey contrasts become relative values. In these low-luminance works, perception takes time — time for our eyes to become dark-adapted.

In *Umbra*, the biomorphic halo plays off the dark center, simultaneously making the delicate petal edge appear brighter and the dark ominous void, darker. In effect, the stark contrast enlivens the center, suggesting not a uniform dark, but an energized deep space. As our eyes adapt, we see an expanse of tiny amoeba shape forms. Prusa, ever-thinking about the dark stuff that provides the gravitational scaffolding for galaxies, populates the center with fluctuating luminance.

Prusa's most recent works demonstrate that darkness is not necessarily the absence of light but can be a source of a particular form of dark-light illumination, a brightness revealed in darkness that enlivens visual perception and suggests that the surface — its thin space — radiates its own energy. In *Umbra*, the darker area becomes reactive to the unpredictability of scotopic vision, redirecting luminance and spectral surface reflectance, whereby the observer becomes intimately and even physiologically engaged with the work. In her low-light works, surfaces appear self-luminous and act less as the color of darkness than the calor (heat) of dark-light. Indeed, as the authors of "*Night Rendering*" put it: "there are many phenomena only visible to the dark adapted eye that are worth rendering for their intrinsic beauty."¹²

For Prusa, the eclipse experience was a game-changing event. It enabled her to move evermore toward blackness, which, she states, was her gateway to abstraction and the freedom to imaginatively explore the unknown, the void, the great expanse. Through experimentation, she engages the power of dark-light to produce deeply felt radiant events. Prusa discovered that darkness is not necessarily the absence of light but can be a source of a particular form of luminance-effects. Her recent dark-light works enliven perception and condition the sensitive observer to see into and beyond the dark expanse. She provides a threshold that opens up pathways and invites us to journey out there, inducing what Brazilian artist Hélio Oiticica calls "a

creative state"¹³ or, alternatively, what Johann Wolfgang Goethe refers to as "pure experience" whereby all the senses are heightened.¹⁴ As it turns out, the unknown dark stuff out there perceptually resonates within dark-adapted human perception and insightfully reverberates within the depths of artistic imagination.



¹In Alfred Barr's 1945 questionnaire, Henri Matisse makes this comment in regards to Gourds (1914-5).

²https://archive.org/stream/Cosmos-CarlSagan/cosmos-sagan_djvu.txt [accessed July 10, 2018]

³"Conversation with Carol Prusa," Carol Prusa: Liminal Worlds, exhibition catalog, Cora Miller Gallery, York College of Pennsylvania, 2013.

⁴For example, see Dava Sobel, *The Glass Ceiling: How the Ladies of the Harvard Observatory Took the Measure of the Stars* (Penguin Books, 2016) and George Johnson, *Miss Leavitt's Stars: The Untold Story of the Woman Who Discovered How to Measure the Universe* (W.W. Norton, 2006).

⁵Richard Holmes, "Maria Mitchell at 200," *Nature*, vol. 558 (2018): 370-1. doi: 10.1038/d41586-018-05458-6.

⁶Kenneth Chang, "The Illuminating Power of Eclipses," <https://www.nytimes.com/2017/08/14/science/eclipse-discoveries-science.html>

⁷Dennis Overbye, "The Eclipse that Revealed the Universe," <https://www.nytimes.com/2017/07/31/science/eclipse-einstein-general-relativity.html>

⁸Stephen Palmer, *Vision Science: Photons to Phenomenology* (MIT Press, 1999) 15.

⁹Joseph Levine, "Color and Color Experience: Colors as Ways of Appearing," *dialectica* vol. 60, no. 3 (2006): 272.

¹⁰Robert Pasnau, "The event of color," *Philosophy Studies* vol. 142 (2009): 353-369.

¹¹Stephanie Rosenthal, ed., *Black Paintings: Robert Rauschenberg, Ad Reinhardt, Mark Rothko, Frank Stella* (Hatje Cantz Verlag, 2007) 13.

¹²Henrik Wann Jensen et al, "Night Rendering" (2000) [<http://graphics.stanford.edu/~henrik/papers/night/night.pdf>] [accessed November 25, 2013].

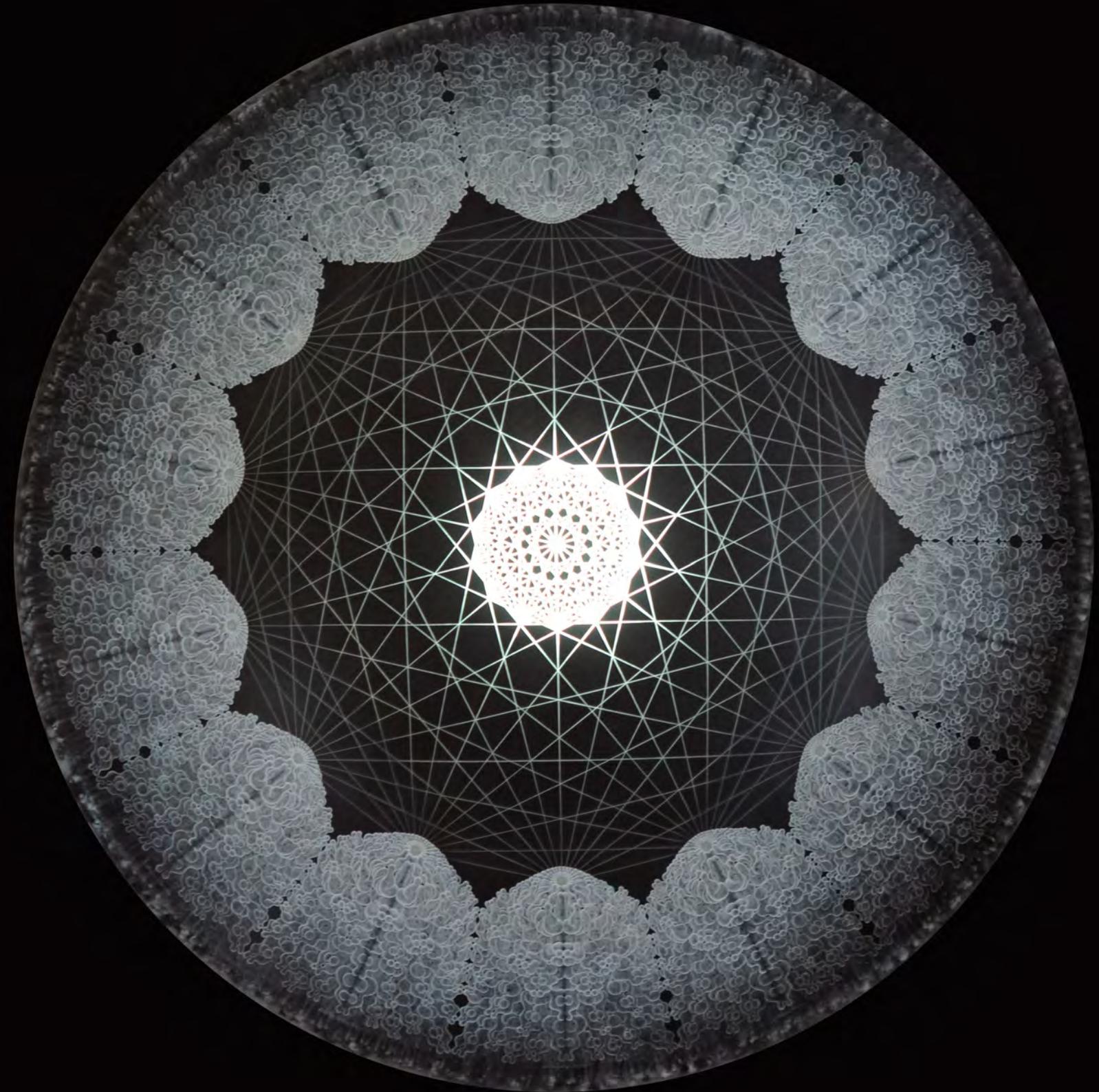
¹³For Hélio Oiticica, artistic expression was about freedom and liberty. The artist's search, he states, "is not for a new conditioning of the participator, but an overturning of every conditioning in the quest for individual liberty, through increasingly open propositions, aimed at making each person find within themselves, through accessibility, through improvisation, their internal liberty, the path for a creative state... the "experimetal exercise of liberty." Quoted in Jane Alison, "Colour Me In," in *Color After Klein: Rethinking Colour in Modern and Contemporary Art*, Jane Alison ed. (London: Black Dog Publishing, 2005) p. 19.

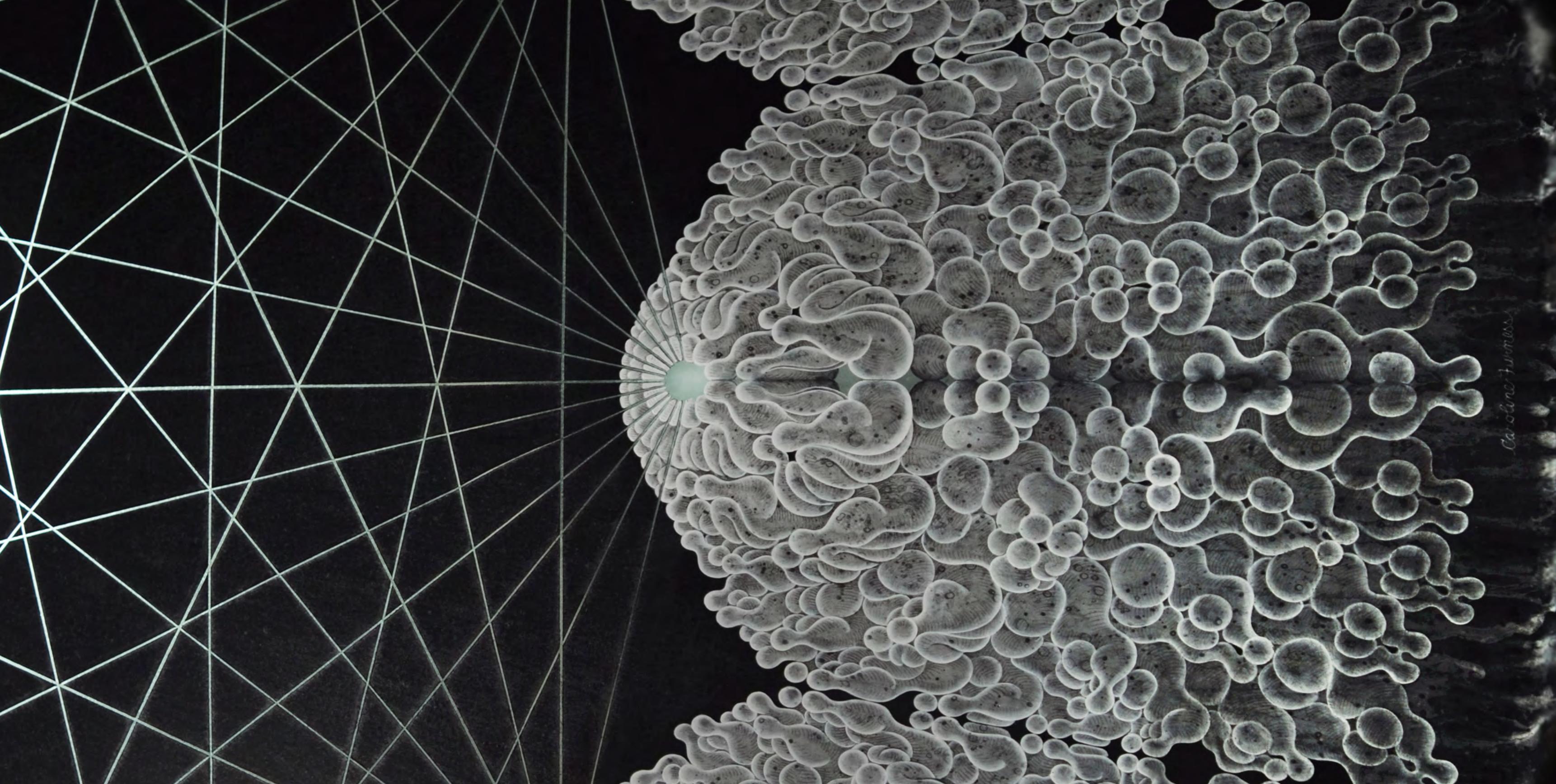
¹⁴Johann Wolfgang von Goethe, quoted in *Goethe's Way of Science: A Phenomenology of Nature*, eds. David Seamon and Arthur Zajonc (Albany, NY: State University of New York Press, 1998) 4.

BARBARA L. MILLER is Professor of Art and Art History at Western Washington University, where she curates, writes and teaches on the intersections between art, science and technology. Working directly with the Holt-Smithson Foundation, geologists, astronomers, and lighting installation artists, she is currently curating an exhibition, *Nancy Holt's Stone Enclosure: Rock Rings (Geological Place and Cosmological Space)*. This curatorial endeavor is part of a larger research project that focuses on "naked-eye" artist-observers and profound resonances between local place and deep space.

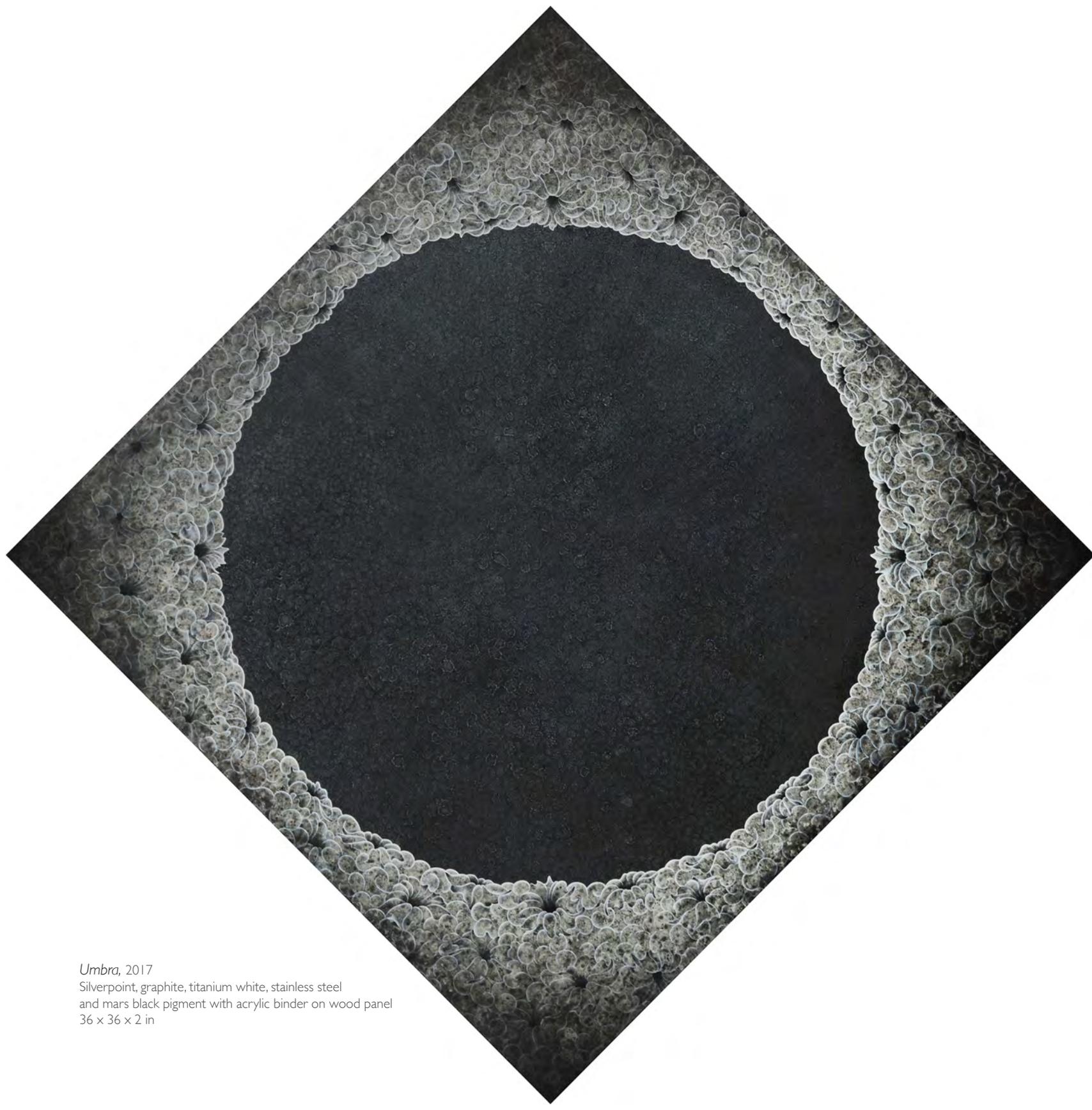
Adlaide Ames
Annie Jump Cannon
Pricilla Fairfield Bok
Williamina Paton Stevens Fleming
Caroline Furness
Margaret Harwood
Henrietta Swan Leavitt
Antonia Maury
Maria Mitchel
Cecelia Payne Gaposchkin
Helen Sawyer Hogg
Martha Betz Shapley
Ida Woods
Anne Sewell Young

Cosmic Web (for the Harvard Computers), 2018
Silverpoint, graphite, titanium white, stainless steel and mars black pigment
with acrylic binder on acrylic hemisphere and internal light
62 x 62 x 12 in

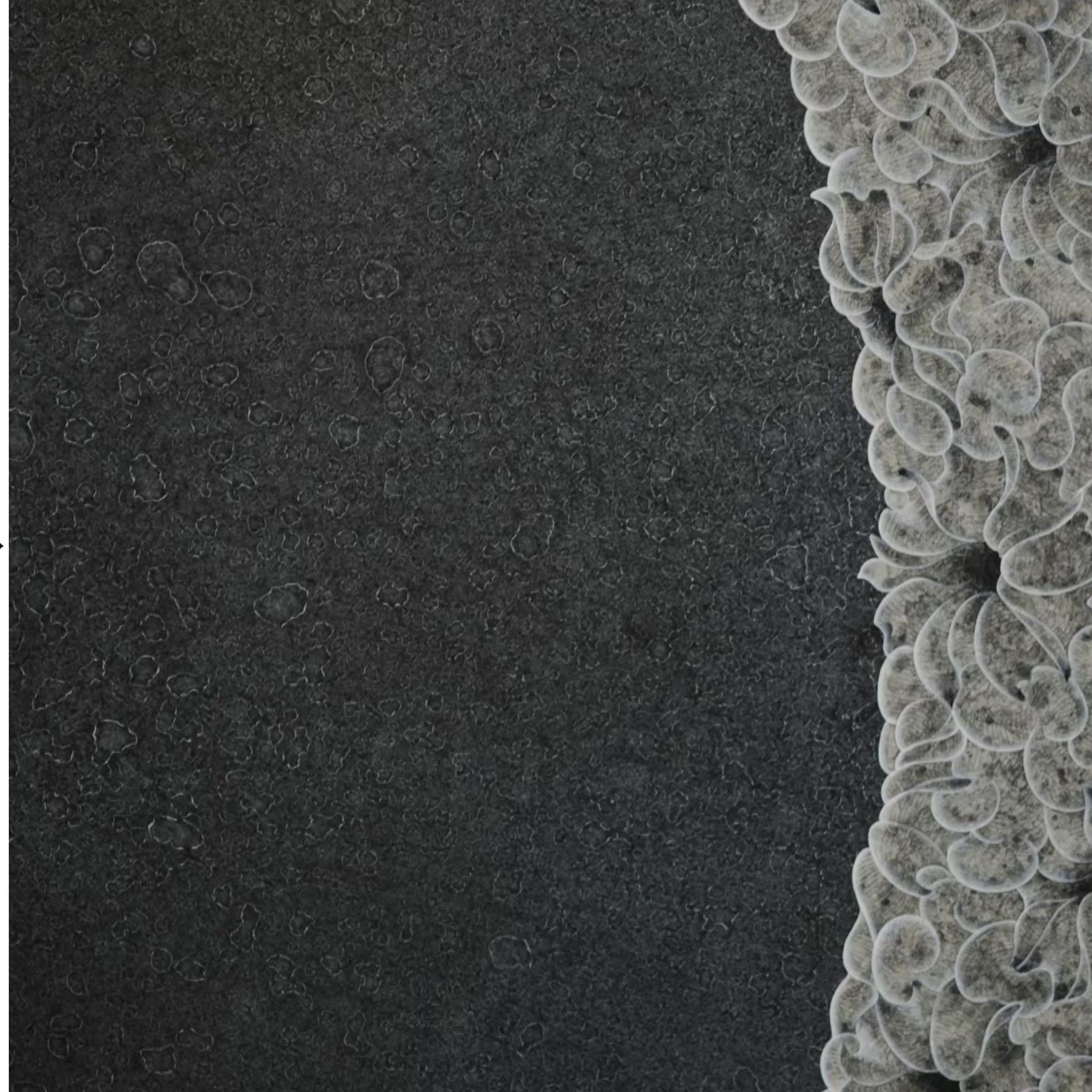


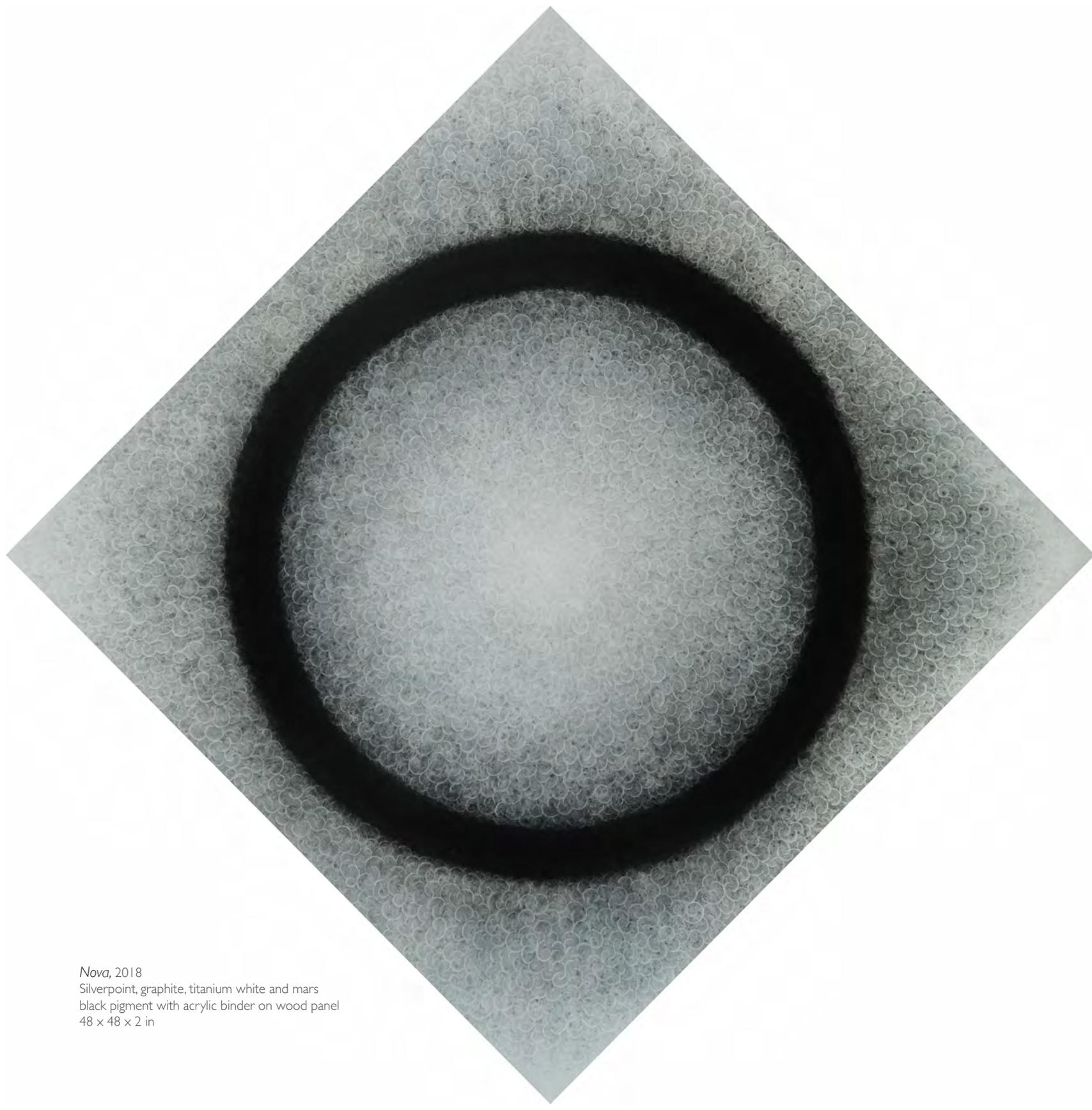


Carolina Fumiss



Umbra, 2017
Silverpoint, graphite, titanium white, stainless steel
and mars black pigment with acrylic binder on wood panel
36 x 36 x 2 in

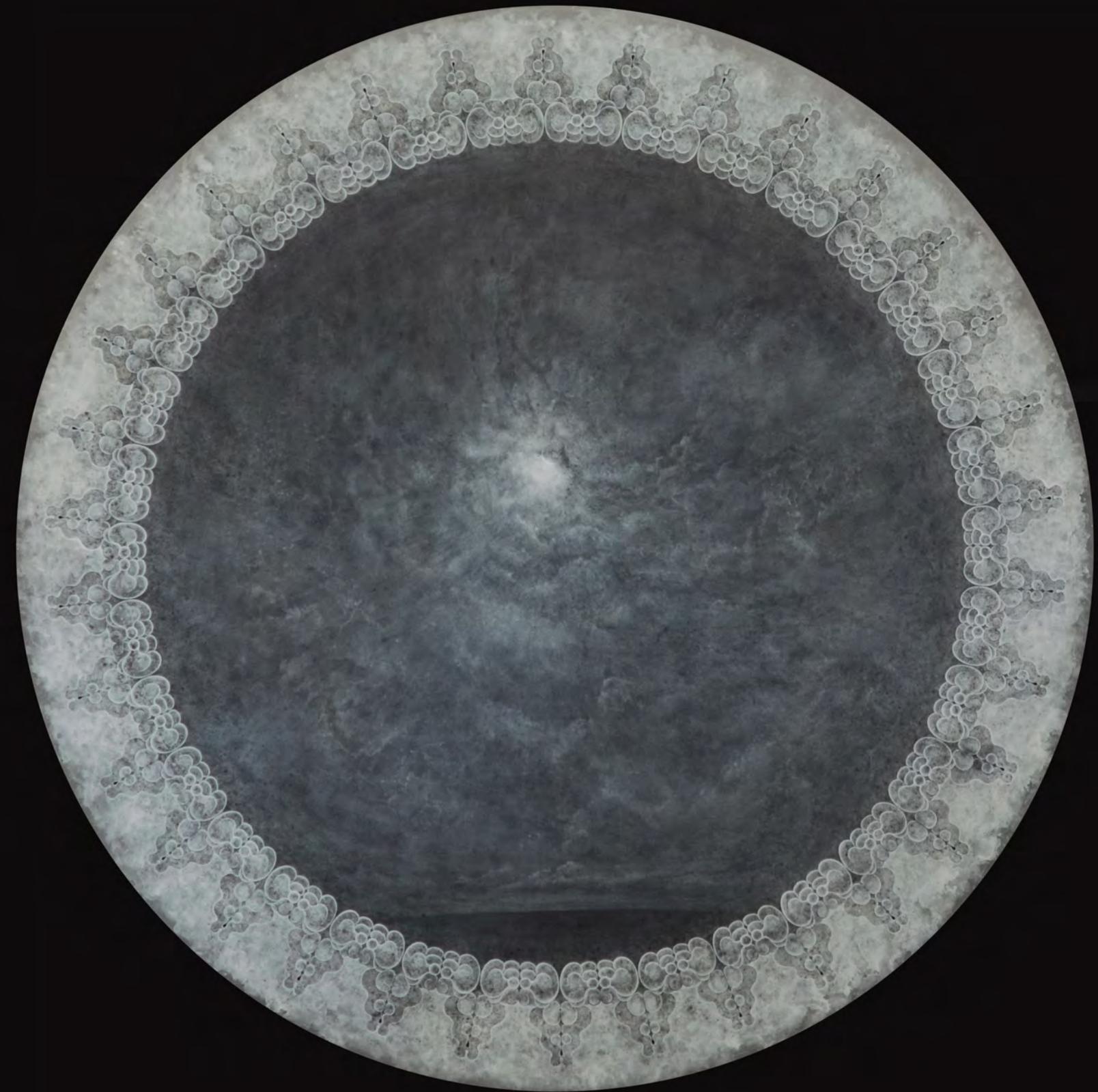




Nova, 2018
Silverpoint, graphite, titanium white and mars
black pigment with acrylic binder on wood panel
48 x 48 x 2 in



Dark Energy, 2017
Silverpoint, graphite, titanium white and mars
black pigment with acrylic binder on wood panel
36 x 36 x 2 in



Crescent, 2017
Silverpoint, graphite, titanium white and mars
black pigment with acrylic binder on acrylic circle
40 x 40 x 2 in



Diamond Ring, 2017
Silverpoint, graphite, titanium white and mars
black pigment with acrylic binder on acrylic circle
30 x 30 x 2 in

Between Day and Night, 2017
Silverpoint, graphite, titanium white and mars
black pigment with acrylic binder on acrylic circle
60 x 60 x 2 in



Connection is fleeting. A pregnant belly distends towards a potential big bang. Macro and micro scales collide in intimate exchanges. The chaotic abyss rebounds. There are no answers but you feel infinitely generous. – Carol Prusa

CAROL PRUSA is a contemporary artist known for her meticulous silverpoint technique and use of unexpected materials from fiberglass to metal leaf and LED lights. In the 2015 catalogue essay for the exhibition *Drawing in Silver and Gold: Leonardo to Jasper Johns* at the National Gallery of Art (Washington D.C.), Bruce Weber called Carol Prusa “one of the most innovative artists working in metalpoint today.” Born in Chicago, Prusa lives and works in South Florida and exhibits internationally, represented in Asia and Europe, as well as nationally at Brintz Gallery (Palm Beach) and Jenkins Johnson Gallery (NYC and San Francisco). Her work is included in excellent public and private collections, including the Perez Art Museum (Miami), The Museum of Arts and Design (NYC), and the Francie Bishop Good and David Horvitz Collection.

In 2018, Prusa was exhibited alongside Sanford Biggers, Cauleen Smith, Josh Faught, and Lauren Kalmar, among others, in *The Future of Craft* (curated by Shannon Stratton) at The Museum of Arts and Design (NYC), and she also participated in *FLATT???* (2018, NY), curated by William Stover. In 2017, Prusa was featured in *Glasstress* which included artists Petah Coyne, Michael Joo, Vik Muniz, Cornelia Parker, Fred Wilson, among others. She participated in the 2015-2016 Miami Biennale (curated by Adriana Herrera), along with twelve other artists, including El Anatsui and James Turrell. In 2015 Prusa was one of 40 artists chosen by the American Academy of Arts and Letters to exhibit in the 2015 Invitational Exhibition of Visual Arts (NYC). Nominated by Judy Pfaff, the selection committee that year chaired by Eric Fischl, selected her for a purchase award. In 2014, Prusa’s work was exhibited alongside works by Louise Nevelson, Nick Cave, Julian Opie, and George Segal at the Jewish Museum of Florida in an exhibition titled *The Chosen*. Other notable group exhibitions include *The Luster of Silver* (2006) at the Telfair Museum, *Shades of Grey* (2008) at the Frist, Nashville, *Set to Manual* (2009) at Girls’ Club (with Vija Celmins, Annette Messenger, Kiki Smith, and Jessica Stockholder), *Starry Messenger* (2009) at the Louisiana Museum of Art and Science (with Vija Celmins and Eva Lee), and *Luminous Line* (2010) at Scripps College. Additional curated museum exhibits include The Bascomb Museum (2016), Morris Graves Museum (2015), Grand Rapids Museum of Art (2013), Hunter Museum of American Art (2013), and Miami Art Museum (2010). Prusa will have a solo exhibition at the Boca Raton Museum of Art in 2019.

Carol Prusa received a SECAC Artistic Achievement Award in 2017. She was previously awarded a Brown University Howard Foundation Fellowship and has been nominated for a MacArthur Fellowship “Genius Grant.” Prusa has also curated notable exhibitions, including co-curating *Pour* (2013) at Lesley Heller Gallery and Asya Geisberg Gallery (NYC), featuring works by David Reed, Carrie Moyer, Roland Flexner, and Jackie Saccoccio, among others. She regularly lectures about her work at such venues as Carnegie-Mellon University (Pittsburgh), University of Cape Town (South Africa), and Parsons School of Art and Design (NYC).

Prestigious recent artist residencies include the Kohler Company Residency in Wisconsin, where Prusa also had a solo exhibition at the John Michael Kohler Arts Center, and Berengo Furness, Murano, Italy, where Prusa worked in glass.

In a 2014 feature in *Elephant Magazine*, Margherita Dessanay writes that Carol Prusa uses art to investigate “the boundless wonders of the universe.” And Kara Walker-Tome, writing for *The Art Economist Magazine* (June 2011), states: “Carol Prusa creates a new vision of the powers of the universe in each artwork she makes. Inspired by cosmology and all of the natural sciences, Prusa creatively explores these practices, arriving at pictorially stunning re-interpretations of their theories.”



Maria Mitchell

